DEVICE FOR THE DISTRIBUTION OF A VISCOUS OR LIQUID PRODUCT, ESPECIALLY A WASHING PRODUCT

[0001] The present invention relates to a device for the distribution of a viscous or liquid product, especially a washing product, that allows the product to be retrieved [collected] on a distribution surface.

[0002] PCT patent WO0030519 describes a device for dispensing washing product, in particular for the washing of dishes, constituted by a solid or solidified washing product with means for connecting to a support and a surface designed to allow the retrieval of a surface sample of the washing product with the aid of a washing instrument.

[0003] This device of the prior art is adapted for solid or gelled products with an inherent [natural] consistency. It is not adapted to the distribution of liquid or viscous products.

[0004] Other documents of the prior art propose solutions for the distribution of liquids.

[0005] For example, patent EP753466 is known, that describes a device for conditioning and distributing a liquid, gelled or pasty product such as a cosmetic product, comprising a reservoir suitable for containing the product and for being placed under pressure for distributing this product. It comprises an applicator in the form of a dome communicating internally with this reservoir and provided with exit orifices for the product to be distributed. The product flows out via these exit orifices by the product being placed under pressure upstream from these orifices.

[0006] The applicator comprises an elastic external membrane for the application of the product on a large surface such as the skin, traversed by orifices for the distribution of the product, and an internal support wall on which this membrane rests when this product is not being placed under pressure for its distribution, which internal support wall comprises feed orifices offset relative to these distribution orifices in such a manner that the external membrane

isolates, when it is at rest, these feed orifices from the outside. Moreover, the external membrane can separate elastically from this internal support wall under the effect of the pressure of the product for the distribution in order to permit the flowing of the latter from these feed orifices toward these distribution orifices and the exiting of the product from the applicator.

[0007] According to this solution the internal excess pressure separates the two membranes and thus causes the flowing of the liquid, gelled or pasty product. There is therefore an outflow of the product as long as the membranes are separated, which is a significant problem in the case of a device for the distribution of a viscous or liquid product, in particular a washing product. Moreover, this solution implies that the distributor is held with one hand, that a pressure is exerted on it for extracting the liquid that it contains and placing it on a tool held with the other hand, which prevents the object to be cleaned from being held at the same time.

[0008] Thus, one ends up with manipulations that are not very ergonomic and oblige one to put down the article to be cleaned, to grasp the product distributor, on which a pressure is to be exerted with one hand, to approach the cleaning tool on which the washing product is to be placed and that is held by the second hand, and to then put down the distributor before being able to grasp the article to be cleaned.

[0009] US patent 6,031,138 relates to a sintered, porous, polymeric material that can be used as the applicator surface of a distributor if this material is molded by insertion into a relatively rigid, substantially non-porous frame. This material should be flexible and have a thickness less than approximately 0.15 cm. Due to the fact that it is molded by insertion into a relatively rigid, substantially non-porous frame, the gel or lotion is distributed at the level of a more central part of the applicator surface, which prevents a distribution on the edge, which would bring about a wasting and a clogging up of the surface of the recipient. Moreover, due to the using of a rather

thin part of the sintered, microporous, polymeric material connected to a relatively non-porous frame, the flexibility of this material is increased and its resistance to chock is elevated. The distribution is also facilitated by virtue of the reduced thickness of the sintered, microporous, polymeric material.

[0010] This solution is not totally satisfactory either. The porous material is permeable in both directions and quite particularly from the outside toward the inside. This brings about a pollution of the product contained in the distributor. Moreover, this solution can not be used in the case of viscous liquids such as the dishwashing product because the product obstructs the membrane pores.

[0011] The invention has the problem of rectifying these various disadvantages by proposing in its most general meaning a device for the distribution of a liquid, viscous or pasty product in order for it to be retrieved with a tool or by the hand of a user, comprising a reservoir for containing this product and emptying in a distribution zone for the retrieval of this product, characterized in that the distribution zone has openings determined in such a manner as to prevent the product from filtering out in the absence of an action by the user and that the reservoir is placed under an excess pressure that is determined as a condition of the use at a value less than the pressure that causes the seeping [oozing] of the product when the device is at rest, which pressure is, moreover, sufficient to bring about the exfiltration of the product onto the distribution zone when the user exerts an action on this distribution zone.

[0012] The distribution zone or retrieval zone is a surface on which the product is delivered and rendered accessible for being retrieved by a tool, even by the fingers of the user.

[0013] The reservoir can be constituted by one or several compartments emptying onto the distribution zone. When it is composed of several compartments it permits the delivering of

multiphase products constituted, e.g., by different components to be mixed during their use. The mixture is then made on the distribution zone. In the case of several compartments or of several reservoirs, each of the compartments or reservoirs will be placed under an excess pressure.

[0014] The atmospheric pressure acting on the product in the reservoir generates an excess pressure between the inside and the outside of the retrieval zone by virtue of the gravity of the product.

[0015] It preferably comprises a means for placing the reservoir under a permanent pressure greater than atmospheric pressure.

[0016] The term "placing under permanent pressure" denotes in the sense of the present patent that the reservoir is subjected to a pressure greater than the atmospheric pressure not only when the device for distributing the product that it contains is used but also during rest, and that the excess pressure prevails in the reservoir during a lapse of time greater than the period of use. This does not concern an excess pressure exercised only at the moment at which the attempt is made to extract a quantity of liquid contained in the reservoir. For this, it is therefore necessary that the reservoir is closed by a distribution zone that ensures a certain tightness at rest and only allows the liquid (or air) to pass when an action is exerted on the distribution zone. The excess pressure alone is not sufficient for opening the distribution zone.

[0017] According to an embodiment the means for placing under pressure is constituted by a piston.

[0018] According to a variant this piston is loaded by a weight exerting a vertical force on the piston.

[0019] According to another variant this piston is subjected to the action of a spring supported on an adjustable base in order to adjust the pressure exerted on this piston.

[0020] According to yet another variant this piston is subjected to the action of a base adjustable by a manual pressure in order to adjust the excess pressure exerted by this piston.

[0021] According to another variant the means for placing under pressure is constituted by a part of the reservoir with a variable volume subjected to the action of a force for placing under tension.

[0022] According to a particular embodiment the part of the reservoir with a variable volume is formed by a bellows.

[0023] According to an alternative solution the means for placing under pressure is constituted by the product column and the distribution zone is situated in the lower part of the reservoir.

[0024] These three latter variants allow the pressure drops resulting either from the extraction of a quantity of product or simply from the imperfect tightness of the distribution zone at rest to be compensated. The distribution zone preferably has at least one slit whose dimensions are determined in such a manner as to prevent the exfiltration of products in the absence of an action on the surface of this distribution zone.

[0025] The distribution zone advantageously has a plurality of slits.

[0026] According to a variant the slits form a multidimensional network.

[0027] According to a particular embodiment the slits form angles between 60 and 80° with the outer surface of the distribution zone. This orientation is advantageous because the slits are constrained to come into a position of closure under the effect of the excess pressure prevailing in the reservoir.

[0028] According to another particular variant the slits have an elongated form completed at each end by a punching with a greater width than that of the elongated segment.

[0029] According to a particular embodiment the slits are formed at the top of protuberances.

[0030] The protuberances are preferably constituted by slit hemispherical domes.

[0031] According to a variant the protuberances are constituted by slit lamellae.

[0032] According to another variant the slits are formed between two consecutive protuberances.

[0033] The distribution zone is preferably formed at the lower part of the liquid and obturates the product reservoir at rest.

[0034] It can advantageously be provided with a flexible valve that keeps the product from drying out while allowing air to reenter when a low pressure appears in the bottle as a consequence of the retrieving of product on the distribution zone.

[0035] According to a particular embodiment the distribution zone has a valve effect.

[0036] According to a particular embodiment the distribution zone comprises a conduit formed between two membranes of which at least one is flexible.

[0037] The invention will be better understood from a reading of the following description that makes reference to the attached drawings corresponding to non-limiting exemplary embodiments in which:

Figures 1, 2 respectively show a perspective view and an exploded view of a first exemplary embodiment.

Figures 3 to 10 show sectional views of different embodiments of the slits.

Figures 11, 12 show sectional views of the distribution zone in two different positions.

Figure 13 shows a view of a second embodiment.

Figure 14 shows a view of a third embodiment.

Figures 15, 16 show sectional views of a fourth embodiment.

Figure 17 shows a perspective view of a fifth embodiment.

Figures 18 to 21 show views according to a sectional plane passing through axis AA of the embodiment pointed out above in different stages of retrieval.

Figures 22, 23 show views according to a sectional plane similar to the preceding one of a sixth embodiment.

Figures 24, 25 show a sectional view of another variant of an embodiment.

Figure 26 shows a sectional view of a variant of an embodiment in which the membrane is supported on a rigid perforated plate.

Figure 27 shows a sectional view of a variant of an embodiment in which the membrane comprises a network of partitions (230) that render it rigid.

Figure 28 shows a variant of an embodiment in which the body comprises a bottle pourer.

Figure 29 shows a variant of an embodiment in which the distribution zone comprises a bottle pourer.

Figures 30 to 32 show another variant of an embodiment in which the body containing the product cooperates with a base.

Figure 33 shows another embodiment.

Figures 34 to 36 show another embodiment of the flexible membrane.

Figures 37 to 39 show three other embodiments.

[0038] The invention will be described in the following for a particular application, namely, the distribution of dishwashing product.

[0039] For washing dishes in running water, the objects to be washed, the brush or sponge and the dishwashing liquid, usually in a liquid form in a simple bottle, must be manipulated.

[0040] The major ergonomic problem is that one has only two hands for manipulating three objects, which causes numerous manipulations that are not very rational, such as changes of the hands.

[0041] The invention relates to a device that permits the retrieval on its surface of a more or less viscous liquid product, in particular liquid for washing dishes manually.

[0042] This device readily permits the retrieving of a precise dose of product simply by applying its tool on it.

[0043] The retrieved amount of the substance should be a function of the pressure and of the width [extent] of the movement on the surface.

[0044] The distributing device in accordance with the invention is placed in a stable manner or firmly fixed, e.g., on the edge of the sink for a dishwashing liquid.

[0045] It comprises the following main constituent elements:

- One or several product reservoir(s),
- An outflow zone controlled by pressure or deformation that closes the reservoir at rest.

[0046] It strives for the following effects:

- Absence of seepage: The liquid should not seep through the outflow zone,
- Distribution: The liquid should flow out when the outflow zone is stimulated by applying a tool on it that is to be charged with product (brush, sponge, etc.] or a surface on which a coating is to be realized (skin, leather, wood, etc.).

- Barrier: If another liquid comes in contact with the outflow zone (e.g., water introduced by a wet sponge), this latter liquid should not penetrate into the enclosed area in order to not contaminate the liquid contained in the reservoir.

[0047] Note that the effect of distribution is relatively in contradiction with the two other points and all the more if it is desired:

- That the retrieval of a dose can be made in an instantaneous and intuitive manner,
- In a relatively consequent quantity (in the case of dishes, the average dose is rather significant – on the order of 0.1 ml).

[0048] The solution proposed is an outflow zone behind which the liquid is maintained with a slight excess pressure that is not sufficient to cause the liquid to traverse the outflow zone, but under the action of the tool used to do the dishes the outflow zone is deformed, which has two consequences that may be combined:

- A supplementary excess pressure in the volume that releases the escape via the outflow zone,
- Deformations of the outflow zone that augment or actuate the opening of the outflow zone and cause the escape.

[0049] Note that the difference of pressure allows the liquid to be always available, backed up behind the outflow zone. Then, a liquid coming from the outside has no tendency to cross the outflow zone.

[0050] Figures 1, 2 show a first exemplary embodiment. The device is constituted by a cylindrical reservoir 1 consisting of rigid plastic closed by an elastic membrane consisting of an elastomere 2 whose outer surface forms the distribution surface. This membrane 2 is cut in a

compact rubber film with a density of 1.5 and a hardness of 60 Shore A and a thickness of 0.7 mm and has radially oriented slits 3. Each slit or cut 3 has a length of 4 to 5 mm.

[0051] Membrane 2 is fixed on reservoir 1 with the aid of ring 100 with annular peripheral shoulder 101 that ensures the tightening of the membrane on reservoir 1. The upper part of the reservoir is closed by front cover 103 comprising orifices 102. Membrane 2 comprises incisions or slits 3. When cover 103 is superposed on membrane 2, the zone with slits 3 on membrane 2 and the zone with orifices 102 of cover 103 are preferably different. When there is in excess pressure in the reservoir the membrane is curved [convex]. When there is no longer an excess pressure, e.g., because all the liquid causing the curve [convexity] has been retrieved, the membrane becomes flat again.

[0052] It then rests preferably on a solid, rigid zone that allows the user to visualize the fact that he must re-create an excess pressure if he desires to continue retrieving product. This solid, rigid zone also allows the user to be prevented from continuing to retrieve liquid that might create air pockets that might cause the reentering of water or of contaminants into the recipient.

[0053] This position of the membrane can also be brought about by the user by voluntarily and provisionally suppressing the internal excess pressure during the periods of non-use. This position is then suitable for a stable storage since the exchanges between the interior and the exterior are then limited, in particular if the solid, rigid zone covers all the membrane zone comprising the slits.

[0054] Reservoir 1 is provided with a piston 4 sliding in a tight manner in the reservoir body, whose lower end forms an outer casing [shell]. The piston allows the inner volume of the reservoir to be put under pressure and the pressure to be adjusted when the excess pressure diminishes.

[0055] This excess pressure allows the penetration of air or foreign liquids into the reservoir to be prevented.

[0056] As an option, an inner, elastic membrane separates the first part of a cylindrical body in which the piston is housed from the complementary part forming the product reservoir. The former part forms an outer casing that allows the second part containing the product to be distributed to be put under pressure. The piston does not make direct contact with the product to be distributed, that is put under pressure via the internal membrane on which the pressure of the air compressed inside the first part is exerted.

[0057] The excess pressure can be realized in the various possible configurations by:

1) A piston moved by a pressure screw.

A pressure screw creating a piston effect comparable to the functioning of known glue sticks or deodorant sticks.

2) A piston moved by the intrinsic [inherent] weight of the upper part of the device.

3) A manually moved piston.

4) A pump whose piston is actuated by a plate whose upper surface forms the product distribution zone. In order to increase the excess pressure, one presses on the surface of the plate, e.g., when retrieving product, which brings about an excess pressure in the reservoir and therefore makes product available on the retrieval zone.

The same device can also function with a brake between the outer casing and the piston. The putting under pressure is performed manually via a grasping zone.

In order to limit problems of tightness in the two latter instances, a bladder can be placed in the upper chamber that will be compressed in accordance with the use.

5) A flexible pocket or an accordion.

The pocket or the accordion collapses onto itself.

6) A pressure obtained by gravity.

The distribution zone is situated at the foot of the bottle. The column of liquid creates an excess pressure that is very slight but sufficient for properly backing up the liquid behind the membrane.

Of course, this solution has the disadvantage that the end of the bottle is difficult to access.

7) A pressure generated in an intermediate chamber.

A deformable zone, or more simply, the bottle itself, allows an excess pressure to be created in the recipient and the liquid to be sent into a chamber position directly under the outflow zone via a plunger tube communicating between the two chambers.

During the filling of the chamber positioned under the outflow zone the latter also rises in pressure.

A small valve that keeps the liquid from re-descending is located at the end of the plunger tube.

In order that the bottle returns to the atmospheric pressure the air penetrates into the recipient via a valve or more simply via escapes [leakage ports] at the level of the juncture between the chambers.

[0058] The characteristics of the membrane, slits and the importance of the excess pressure are functions in particular of the nature of the product to be distributed and of the material constituting the membrane forming the retrieval zone. An expert in the art will determine these characteristics by successive trials, varying the characteristics and confirming the result obtained.

[0059] He will confirm the dimensions resulting in an absence of exudation of the product at rest and in a delivery of the product contained in the reservoir when a pressure is exerted on the membrane surface by successive experiments. This is a matter of routine tasks that are performed, e.g., by taking a series of non-perforated membranes with a selected geometry, type and thickness in which slits of an increasing length are made with a constant increment. The curve representing the volume of product exuded during a reference time, e.g., 24 hours, when the experimental device is put down and allowed to rest is established with an internal excess pressure type. The value L1 of the length of the slits from which the exuded volume is non-negligible is noted.

[0060] Likewise, the curve representing the volume of the product delivered during the exerting of a reference pressure with a sample tool during a reference time, e.g., 0.5 second, is established. The value L2 of the length of the slits from which the exuded volume is measurable is noted.

[0061] The optimal dimensions will be less than L1 and greater than L2. Of course, an expert in the art can choose to fix the length of the slits at a constant value L in order to act only on the topography of the membrane or on its thickness or also on the elasticity or the flexibility of the membrane material in order to perform these experimental routine tasks.

[0062] The curved or inclined shape of the distribution zone constitutes an advantage in order to avoid the stagnation of water added by the tool for the retrieval of the product.

[0063] The slits can assume numerous shapes:

- A buttonhole shape with a longitudinal segment and two widened-out zones at the end of this segment.
- An elliptical shape, in particular for very viscous products.
- An inclined transversal plane (that is, one intersecting the surface of the distribution zone).
- An arrangement in a network of slits radiating radially or according to an organized matrix.

[0064] It [the shape?] can be formed by cutting a plane membrane or also be formed at the top of protuberances, e.g., at the top of an elongated dome or also of a pleat in the membrane (figures 3, 4) with the adjacent sides of the membrane then forming types of lips 105, 106 or also at the top of hemispherical domes 110 shown in figure 5 and distributed on membrane 2 as shown in figures 5, 6.

[0065] They can also be formed in troughs of an undulated surface (figures 7, 8). Membrane 2 has series of protuberances with a formation of convex or projecting lips 110, 120 extending via concave or reentering lips 111, 121. Reentering lips 111, 121 link up tangentially along median plane 122 where they are separated by slit 3. This topography has the advantage that the internal excess pressure tends to close the passage zone and to limit the outflow as long as there is no mechanical stimulation of the retrieval zone. The two lips converge tangentially and link up along a contact plane substantially perpendicular to the surface of the distribution zone. When a tool is put on the distribution zone these two lips are slightly deformed and their opening is brought about, thus permitting the outflow of the contents under a slight excess pressure. In

contrast thereto, when at rest the elasticity of the material constituting flanges and lips ensures their closure with a force sufficient to avoid an exfiltration of the contents of the reservoir.

[0066] The slits can also be preceded by reliefs 6 as is shown in figures 9, 10. These reliefs 6 are, e.g., flanges with a triangular section placed along slits 3 in front of the slits when considering the direction 130 of the movement of the retrieval tool. This tool comes to stop against reliefs 6, which brings about a slight deformation of the flexible membrane in the proximity of the adjacent slit 3, which brings about the opening of the slit and releases the product that the reservoir contains under the effect of the excess pressure prevailing in it.

[0067] The membrane traversed by slits has a concave shape prior to assembly as shown in figure 11. During assembly and use it has a convex shape as shown in figure 12, which forces the closure of the slits.

[0068] Figure 13 shows a variant of an embodiment comprising cylindrical body 1 forming a reservoir and emptying in its lower part on retrieval zone 7 that communicates with the reservoir via a distribution zone that opens when one presses on the retrieval zone.

[0069] Figure 14 shows another variant of an embodiment in which membrane 2 is placed on plate 150 integral with pump 151. This pump is, e.g., a pump that is used for manual aerosols and that creates a flow of air that places the reservoir under pressure when an axial action is exerted on plate 150. This pressure causes the product to rise in tube 150 extending into reservoir 1 and causes it to bead [bubble, rise] to the surface of membrane 2. Plate 150 is hollow. The cavity constitutes a buffer reservoir containing product to be distributed. The product is exfiltrated when an action on the surface of the plate presses it down and actuates pump 150 for placing the reservoir under pressure or when the membrane is deformed and

generates a local excess pressure and a deformation that brings about the exfiltration of product by itself.

[0070] Alternatively, the pump can also draw the liquid directly into the recipient and cause it to rise up in the distributor plate, which achieves a relatively equivalent operation.

[0071] Figures 15, 16 show a sectional view of another embodiment in which reservoir 1 placed under excess pressure opens onto distribution surface 2 via two planes 160, 161 adjacent at rest.

[0072] One of the plates, 161, is flexible and extends distribution zone 2. When a pressure is exerted on distribution zone 2 with a retrieval tool this flexible plate 161 is slightly deformed and separates from fixed plate 160 of reservoir 1. It then forms a slight interstice that permits the exfiltration of the product under excess pressure contained in reservoir 1. Optional valve 162 facilitates the outflow of the liquid. It is closed when the two plates 160, 161 are coupled under the effect of the return to the initial geometric configuration due to the memory of the shape of the plastic materials used, e.g., PET.

[0073] Figures 22, 23 show a sectional view a variant of this embodiment in which reservoir 1 placed under excess pressure by the effect of the liquid product column opens onto distribution surface 2 via a passage formed between two planes 160, 161 adjacent at rest. Upper plane 160 belongs to reservoir 1 and lower plane 161 belongs to shoe 170 coupled under reservoir 1 and extended by retrieval zone 7 (neither 2 nor 7 is arrowed in the drawing). When a pressure is exerted on retrieval zone 7' with a retrieval tool, plate 161 is slightly deformed and opens a passage between planes 160, 161 that permits the exfiltration of the product under excess pressure contained in reservoir 1. This interstice is closed when the two plates 160, 161 are coupled under the effect of the return to the initial geometric configuration due to the memory of

the shape of the plastic materials used, e.g., PET, that tends to push flexible plate 161 of shoe 170 back against plate 160 of reservoir 1.

[0074] Figures 17 to 21 show another embodiment in which the distribution of the liquid takes place via deformable conduits 160 to 162 emptying onto distribution zone 2. Reservoir 1 is placed vertically above distribution zone 2. Deformable conduits 160 to 162 are closed when at rest at their ends by a pinched slit. When a tool 165 is approached (figure 18) to distribution zone 2 the latter makes contact with at least one of the conduits 162.

[0075] When a pressure is exerted (figure 19) on conduit 162 with tool 165 conduit 162 is squeezed and the product that it contains is forced in two opposite directions, which creates a slight excess pressure in the downstream segment that tends to open the lips formed at the end of conduit 162.

[0076] Tool 165 is then placed in the direction of the end of the conduit (figure 20), which causes the transport of a mass of product in the direction of the end of conduit 162. When tool 165 reaches the end of the conduit (figure 21) it collects the quantity of product extracted on the occasion of this manipulation.

[0077] Figures 24, 25 show a sectional view of another embodiment.

[0078] Upper membrane 2 has slits of the type described for figures 9, 10, each one with a length of 12 mm, which membrane 2 is realized of material that is deformable but only slightly extensible, e.g., of compact rubber with a density of 1.5 and a hardness of 60 Shore A and a thickness of 1 mm.

[0079] The material of lower membrane 180 closing the piston is selected to be quite elastic, e.g., of latex. The pressure is adjusted in the reservoir by compressing piston 175 under visual control until the liquid beads through slits 3 of the upper membrane. The deformation generated

on the lower membrane procures a reserve of available liquid that will be mobilized during the next actions of the tool on the upper membrane.

[0080] This configuration has the advantage of using an upper membrane that is only slightly elastic while providing a reserve of following [consequent, concordant] liquid.

[0081] The device should be able to resist mechanical stimulations of the retrieval zone without falling over and while moving as little as possible.

[0082] It is therefore preferably stocky with a large base and not very high. Its sole preferably consists of a non-skid material or is provided with a ballast, an adhesive or a suction cup. It can be placed on the edge of the work plane or fixed to the wall with the aid of an adhesive or a screw.

[0083] A flared cup [cap] can be located around the retrieval zone. This cup can be designed to leak in order to avoid any retention of water on the retrieval zone. The retrieval zone can carry small reliefs that ensure a certain retention of the liquid and stimulate the foam.

[0084] It can be provided that the outflow zone is blocked by an adhesive in order to avoid any outflow prior to usage (storage, transport, display, etc.).

[0085] The outflow zone can be closed by a tipping or removable hood.

[0086] In certain situations it is of interest to be able to pour liquid. Thus, the presence of a customary pourer is advantageous or the possibility of forcing the outflow of the liquid via the outflow zone, e.g., by strongly compressing the recipient or strongly actuating the piston.

[0087] It [sic – the device?] can be a package of disposable dishwashing product. It can be a mini-dose of disposable dishwashing product (like cartons of household products).

[0088] It can be a permanent product intended to be refilled.

[0089] The preceding description was formulated for dishwashing products, and that is the main market that we address.

[0090] However, the solution can be applied to many other areas, and in particular:

* Domestic applications:
  - Creams, especially creams for body care, shaving gels, epilation waxes, sunscreen lotions,
  - Shower gels, shampoos and liquid soaps,
  - Wax or liquid wax [polish] for rags,
* Industrial applications:
  - Placing oil or glue on an applicator or on a piece.
* Agrofood applications:
  - Delicacies, paste spreads, etc.

[0091] Furthermore, it is possible to envision that these solutions are used for applicators. The entire product is then taken in the hand for applying the liquid on a surface (waxing, oil on a cake mold, liquid or gel deodorant or also body cream, etc.).

[0092] The invention can result in other embodiments that are described in the following.

[0093] Figure 26 shows a sectional view of a variant of an embodiment in which the membrane rests on a rigid perforated plate.

[0094] Distribution zone 2 comprises flexible membrane 200 forming hemispherical protuberances 210 slit by slit 220. This membrane 200 rests on rigid perforated plate 250 comprising orifices 260 opening on hemispherical protuberances 210. The section of orifices 260 corresponds substantially to the section of hemispherical protuberances 210.

[0095] This variant prevents the flexible distribution zone from collapsing under the pressure of the tool or of the hand. It permits optimizing the performances of the membrane required for ensuring an obturation of the slits and an opening under the pressure of a hand or of a tool for the distribution of the content.

[0096] Alternatively, a similar effect can be obtained by creating a network of partitions 230 under the membrane that rigidify it as shown in figure 27. The membrane is then constituted by a thick structure with hemispherical protuberances 210 opening by distribution slits 220, and semi-rigid intercalary zones with, e.g., a honeycomb structure.

[0097] Figure 28 shows a variant of an embodiment in which the body comprises a bottle pourer.

[0098] According to another embodiment a bottle pourer is provided at the top end of the bottle. When the plug is open it permits a direct usage by outflow and also permits the introduction of air in proportion to the retrieval of the product on the distribution zone.

[0099] It can advantageously be provided with a flexible valve that prevents the product from drying out, while allowing air to reenter when a partial vacuum appears in the bottle due to the retrieval of product on the distribution zone.

[0100] Figure 28 shows another embodiment comprising bottle pourer 270 located under or at the bottom of the bottle. It is necessarily obturated in a tight manner by [when] using by retrieval. It is advantageously provided with pushbutton closure 270. In this configuration the admission of air into the volume of the reservoir is made at the level of the distribution zone itself.

[0101] According to a variant of an embodiment shown in figure 29 bottle pourer 270 belongs to distribution zone 2 and is made from the same material. Bottle pourer 270 remains

obturated when the internal pressure is low and opens when the internal pressure is strong, in particular when the user's hand exerts a direct and significant compression on the bottle body.

[0102] According to another embodiment illustrated by figure 30 the distribution zone is provided with shoe 280 and forms a volume independent of bottle 281, that forms, for its part, the reserve. When the bottle is connected to shoe 280 distribution zone 2 is supplied. The bottle opening is advantageously provided with a valve so that the bottle can be connected to and be connected from the shoe without loss of product.

[0103] According to one another variant of an embodiment shown in figures 30 1, 32 the bottle is formed by a hollow volume and a plug. When it is set on the shoe it is perforated by hollow needle 282 forming a tube, located on the shoe. The liquid in the bottle then reaches the distribution zone. According to another variant the bottle can be a flexible container like that of a carton of milk or a type like plug cartons of the Doy-Pack type [stand-up, custom-printed pouches, of Chinese origin - http://www.biztee.com/Products/1339.html].

[0104] Figure 33 shows an embodiment in which the product is contained in flexible or accordion-type pocket 290. This flexible pocket can be a flexible bag enclosed in a non-tight hollow volume (bag in-the box type). The retrieval zone is then advantageously treated with the plug or added, especially by welding, onto one of the faces of the bag.

[0105] In order to permit the obtention of different sensations and different distribution conditions, the membrane or, more generally, the distribution zone, is provided with exterior reliefs like fibers, deposited in particular by flocking [flock spraying] or pitting [chipping, stitching], like lamellae, foam or grains immersed in the mass.

[0106] Figures 34 to 36 show variants of membrane utilizing flexible reliefs in boss beadings.

[0107] According to a variant of an embodiment shown in figures 34,35 the conduits can be obtained by flexible reliefs in boss beadings placed on a more rigid surface in order to create the effect of a roller pump already present in the variants shown in figures 17 to 21.

[0108] According to a variant of an embodiment shown in section in figure 36 these reliefs can also be obtained by forcibly removing a flexible material, especially a thick elastomere, from the mold, then by creating the exit slit for the liquid by cutting.

[0109] Alternatively, the general form of the distribution zone can be inclined, forming a hollow fold.

[0110] According to a variant of an embodiment shown in figure 37 a specific plug or laminated [plasticized] adhesive 295 is provided obturating the zone in order to render the distribution zone tight, in particular during the transport between the filling of the bottle and its use and between two periods of use.

[0111] In order to facilitate the placing of the adhesive, the distribution zone can be located in an inside recess or encased [boxed-in] zone that permits the adhesive to be applied in spite of the reliefs of the distribution zone.

[0112] Figure 38 shows another variant of an embodiment in which pocket 300 has the general shape of a bar of soap. It is constituted by a flexible membrane presenting, at least partially, retrieval surface 2.

[0113] The pocket can be realized of an elastic membrane, e.g., an elastomere. Retrieval surface 2 is formed by molding or surface treatment.

[0114] Figure 39 shows an alternative in which the pocket is elongated and fixed between the bottom and the top of a package. The pocket is emptied by a progressive mechanical action, e.g.,

a wheel that causes the progression of a carriage that pinches the pocket, thus evacuating its contents into a buffer zone closed by distribution zone 2.